Performance Monitoring Protocol (QA/QC) for the Minolta CR-241 Chroma Meter

1 Scope

This document addresses the performance monitoring (QA/QC) of the Minolta CR-241 Chroma Meter. This document applies to personnel using the associated instrument(s)/equipment in Quantico, VA in the following disciplines/categories of testing: Paint and Chemistry Unit general physical and chemical analysis.

2 Principle

The Minolta CR-241 Chroma Meter, herein referred to as the colorimeter, is a device used for colorimetry measurement. Colorimetry provides a tristimulus color measurement of surfaces (e.g., automotive finishes). Definitions and guidelines for following this protocol are outlined in the "General Instrument Maintenance Protocol."

3 Equipment/Materials/Reagents

a. Instrumentation - Minolta CR-241 Chroma Meter (or equivalent)

b. Calibration Standard - White Calibration Plate (Currently Serial Number 11876001) (Konica Minolta or equivalent)

4 Standards and Controls

4.1 White Calibration Plate

The white calibration plate is provided by Konica Minolta and stored with the instrument. No preparation is required. It does not expire.

5 Calibration

The colorimeter must be calibrated prior to each use and when the measurement selector is changed.

a. With the instrument on and ready for use, select the desired measurement area based on the sample size.

b. Press the CALIBRATE button on the upper left side of the key pad. This will retrieve the previous settings, which will be shown in the display located in the upper right

corner of the base.

c. Ensure that the values are set in Yxy color space. If they are not, press the COLOR SPACE SELECT button until the proper setting is displayed.

d. Place the white calibration plate on the specimen stage and focus the instrument until the dots on the plate and the white surface appear sharp through the viewfinder.

e. Adjust the specimen stage so that the measurement area is centered between the two dots on the calibration plate.

f. Press the MEASURE button. A series of three measurements will be taken. Once calibration is complete, the new values will appear in the display.

g. Evaluate the results based on the 'Decision Criteria' section of this protocol.

h. If all requirements are within specification, prepare the documentation as outlined in the "General Instrument Maintenance Protocol." If any requirements fail, contact appropriate instrument support personnel.

6 Sampling or Sample Selection

Not applicable.

7 Procedures

7.1 Daily Checks

The colorimeter must be calibrated prior to each use and when the measurement selector is changed. Refer to the 'Calibration' section of this protocol.

7.2 Operation

For analysis, samples must have a minimum area of 0.3 mm and should be relatively flat. If a sample is greater than or equal to 1.8 mm in diameter, adjust the measurement area selector accordingly.

a. Place the sample on the specimen tray and focus the instrument on the sample.

b. After focusing, choose the appropriate color space for analysis. This is accomplished by depressing the COLOR SPACE SELECT key (located in the upper right corner of the scope base). For a complete list of color spaces, please refer to the Operator's manual (pg. 13). Note: Munsell is used for automotive finishes.

c. Press the MEASURE button.

d. The instrument will measure the sample in the desired color space and display the results on the digital screen (located just above the COLOR SPACE SELECT key). If desired, a hard copy can be printed by depressing the DISPLAY PRINT key (located just below the COLOR SPACE SELECT key).

e. When analysis is complete, turn the instrument off.

8 Instrumental Conditions

8.1 Chroma Meter

Measurement area:	1.8 or 0.3 mm (diameter)
Mode:	Calibrate
Color space:	Yxy

9 Decision Criteria

Compare the displayed values with the values printed on the inside cover of the calibration plate. Currently, calibration plate serial number 11876001 is in use and the values are:

C	Y 93.1	x 0.3126	y 0.3190
D_{65}	Y 93.1	x 0.3151	y 0.3318

If the values are in agreement, the instrument is now ready for the analysis of samples. If the values do not match, enter the standard (actual) values for the white calibration plate to correct the calibration. Record the correction, operator's name, date, and comments in the QA/QC log.

10 Calculations

Not applicable.

11 Measurement Uncertainty

Not applicable.

12 Limitations

Only properly trained personnel will perform duties involved in the operation, maintenance, or troubleshooting of this instrument.

13 Safety

Take standard precautions for the handling of all chemicals, reagents, and standards. Refer to the *FBI Laboratory Safety Manual* for the proper handling and disposal of all chemicals. Personal protective equipment should be used when handling any chemical and when performing any type of analysis.

14 References

Manufacturer's Instrument Manuals for the specific models and accessories used.

"General Instrument Maintenance Protocol" (Inst 001) *Instrument Operation and Systems Support SOP Manual.*

FBI Laboratory Safety Manual.

Rev. #	Issue Date	History
0	06/21/06	New document which replaces original titled "Performance Monitoring Protocol (QA/QC) for the Minolta CR-241 Chroma Meter."
1	03/08/12	Changes made to equipment and instrument vendor name in Sections 3d and 4.1. Removed minor deviation statement from Section 8. Adjusted Decision Criteria in Section 9 to align with requirements of new calibration plate.
2	10/04/18	Updated Section 1 Scope to include applicable disciplines/categories of testing. Added 'appropriate instrument support personnel' to Section 5 h. Updated heading in Section 6. Updated 'Instrument Operation and Systems Support' in Section 14 and header.

Approval

Redacted - Signatures on File

Drug Chemistry/
General Chemistry
Technical Leader: Date: 09/28/2018

Paints and Polymers
Technical Leader: Date: 09/28/2018

Date:
IOSS Manager: Date: 09/28/2018

Chemistry Unit Chief: Date: 09/28/2018

QA Approval

Quality Manager: Date: 09/28/2018